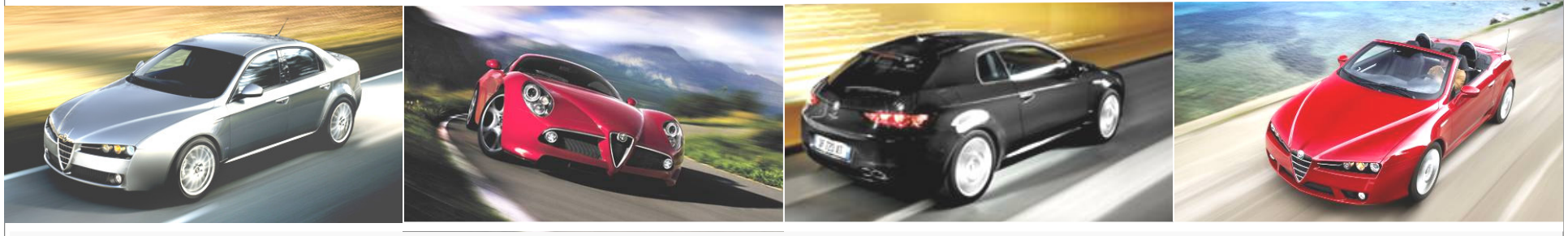


“Electronic Q2”

The new “Electronic Q2” system

Making its debut on the Alfa 159 MY 08 (sedan and Sportwagon), Brera MY 08 and Spider MY 08 is the Electronic Q2. Combining all the advantages of front-wheel drive, enhanced driving pleasure and control, and guaranteeing some of the advantages typical of an all wheel drive system. As a result, the system is matched perfectly to the torque capacity and power output, raising yet further the already excellent performance of these models.

The system works as follows. The Electronic Q2 system makes use of the brake system components, which in turn are controlled in an efficient manner by the ESP control module. The resulting effect is very similar to a limited slip differential (such as a mechanical Torsen differential). In particular, when accelerating out of a curve, the front wheel brake calipers apply torque to the internal wheel, so increasing the grip of the wheel. The traction is permanently balanced in a dynamic manner between the front and rear wheels, according to driving-and road-surface conditions. The Electronic Q2 is linked exclusively to the front wishbone suspension, allowing for a particularly efficient and sporty tuning of the vehicle.

Alfa Romeo, in fact, gained an excellent reputation among it's clients for its front suspension (it's not by chance that many in the motor industries apply our solution). Needles to say, that beyond the overall advantages of this type of design (weight, on-board comfort etc.), when in tight-driving conditions, the understeer prone character of front wheel drive allows the driver to respond to the vehicle’s needs more intuitively. It's here, that the sensation of front-wheel drive is being more “genuine” than a rear-wheel driven vehicle.

Instead, in the all wheel drive versions the Electronic Q2 is mated to the rear axle, further increasing the already famous easy and pleasant driving characteristics of the Q4, and in doing so, conferring a greater perception of sportiness. The performance is that of an integrated all wheel drive system with central Torsen differential and rear self-locking electronic differential.

To emphasize all these qualities, Alfa Romeo has put in place the Electronic Q2 system which has all the advantages of front-and-all wheel drive. Noticeably increasing: road holding, handling, stability, while at the same time reducing understeer and the need for corrective steering-wheel movements

Alfa Romeo “E-Q2” functioning

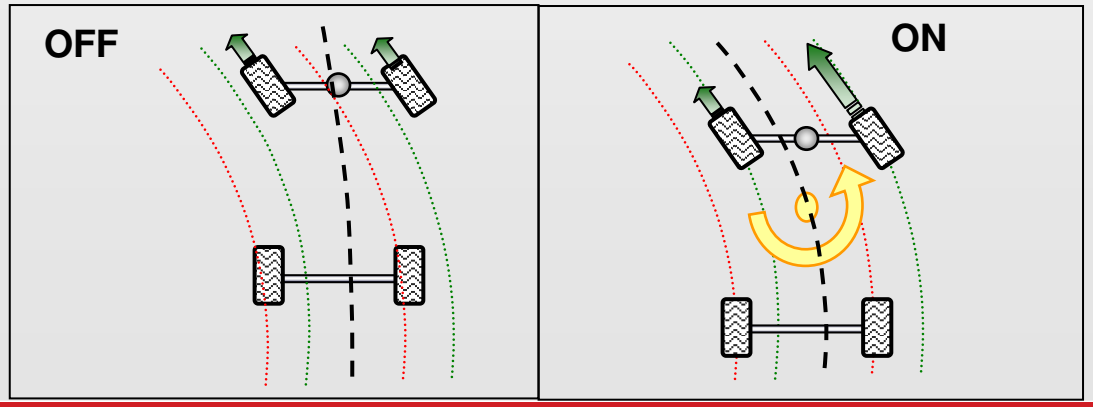
Thanks to the evolution of electronics and hydraulic stability control systems, Alfa Romeo is able to modulate, in a continuous manner, the torque transfer to the wheels based on grip, vehicle speed and lateral acceleration.

This means that nowadays, with the new E-Q2 function it is possible to control the braking, in a proportionate manner, of the **particular** wheel, which is about to lose grip and allow for the optimal torque transfer in terms of the best compromise between traction (in terms of acceleration) and the intended course.

The extent of the E-Q2 system’s intervention depends on: throttle position, selected gear, engine rpm, and difference in slip between the internal and external wheels.

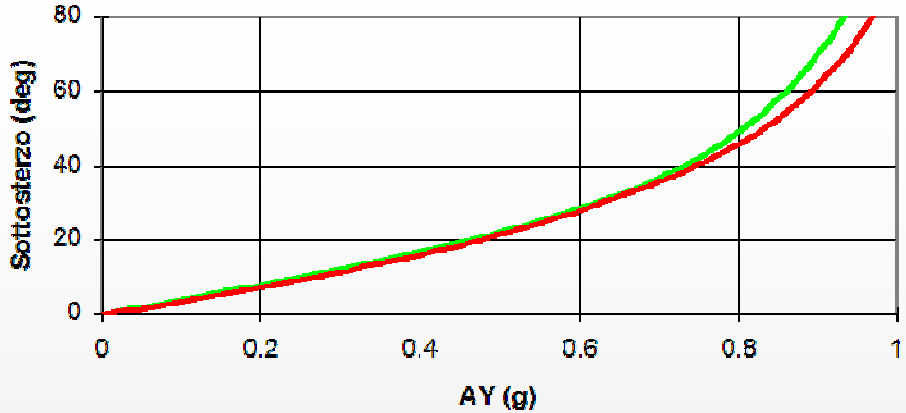
This system represents an evolutionary leap for front wheel driven vehicles compared with conventional traction control systems, as illustrated below.

When accelerating out of curve, without E-Q2, the internal wheel is subjected to a load reduction, thus increasing wheel slip and, because of the presence of a conventional differential, resulting in reduced traction capacity for the entire axle. Simultaneously, because of the traction loss, the vehicle tends to widen its course (understeer). The E-Q2 system, on the other hand, applies brake force to the inner wheel by means of a signal from the VDC control module, resulting in a torque increase to both drive shafts and therefore also transferring torque o to the external wheel with grip.



Alfa Romeo “E-Q2” functioning

The E-Q2 system allows the driver to reach higher lateral acceleration levels during cornering, reducing understeer and the necessary steering angle to maintain the intended course



E-Q2 ON
E-Q2 OFF

Therefore we can say that the active intervention of the E-Q2 system is improving cornering traction while controlling understeer at the same time.

The perceived effect is similar to that of a Q2 front differential; the moment in which internal wheel slip occurs, for example when accelerating in a curve, the E-Q2 slightly applies brake force to the internal wheel to allow torque to be transferred to the external wheel, thus maintaining speed and intended course.

The effect is perceptible until the limit of the external wheel’s grip is reached, at which point the conventional traction control (ASR) intervenes by limiting engine torque and/or through application of the brakes.

This means that the ASR intervenes at the moment when both wheels start loosing grip, which is more **pronounced** because of the torque cut and activation of the brake system.

The E-Q2 system works **independently of the VDC system** regardless of being part of the same vehicle stability control system: VDC intervenes in case of excessive over-or-understeer when it detects excessive rotation of the vehicle with respect to its vertical center axis, also when no power is being transferred to the driven wheels or with excessive steering being applied.

Alfa Romeo “E-Q2” functioning: example

Example one: Vehicle cornering

While following a curve in low grip conditions (wet roads, snow, sleet, etc.) or when driving in a sporty manner, one often encounters loss of grip of the internal wheel. At the moment in which the internal wheel loses its hold of the road surface, a traditional differential transfers an amount of torque to the outer wheel equal to that of the inner wheel, which is insufficient for adequate traction.

During this situation there can be two different solutions, depending on the equipment level of the car. In fact, on a model not equipped with ASR –VDC, the perceived result is internal wheel spin and loss of vehicle control (a high level of understeer) as well as a lack of acceleration when exiting the curve. If, on the other hand, the vehicle is equipped with ASR - VDC, the systems will intervene by reducing engine torque output, by means of controlling the throttle valve and acting on the brake system, which makes throttle modulation impossible leading to the undesirable impression of power loss..

In both cases, the result is that one perceives being “sluggish” while exiting the curve.

What happens when the “E-Q2” system is present

At the moment in which the inner wheel loses grip, the torque is being partially transferred to the external wheel by means of light braking pulses to the inner wheel, resulting in reduced understeer, increased stability and higher cornering speed.

All of which increases vehicle control and driving pleasure.

Example 2: low grip road surfaces

When driving on low grip surfaces, it often happens that the driven wheels experience different traction conditions. For example, when travelling on wet or snowy roads, the two wheels could be subjected to differences in grip.

In these particular conditions, driving off or accelerating strongly could result in spinning of the wheel with the least traction, resulting in a significant reaction at the steering wheel, an inadequate drive off and the need to make steering corrections in order to maintain the intended course.

What happens when the “E-Q2” system is present

The negative effects are being countered thanks to the slight brake application to the wheel which is losing grip, as well as the progressive transferring of torque to the wheel with the most grip. This eases, for example, up hill starts, and travelling on slippery roads safer and more comfortable.

The Innovative Solution → the E-Q2 system

Auto-locking Differential

Electronic Q2

Mechanical

Characteristics*

Advantages:
- Road holding
- Traction
- Feeling

Disadvantages:
- Reactions at the steering wheel (with Mc Pherson suspension)
- High cost > availability on top equipment levels
- Weight (on front axle)

Mechanical + electronic control

Characteristics*

Advantages :
- Road holding
- Traction
- Feeling
- **Tuning possible**

Disadvantages :
- Reactions at the steering wheel (with Mc Pherson suspension)
- High cost > availability on top equipment levels
- Weight (on front axle)

Electronic control

Advantages :
- Road holding
- Traction
- Feeling
- **Tuning possible**
- Lack of steering wheel reactions
- Limited cost > extension to the entire model line
- Applicable to Q4 as well (on rear wheels)

Disadvantages:
- Slightly less effective at the limit

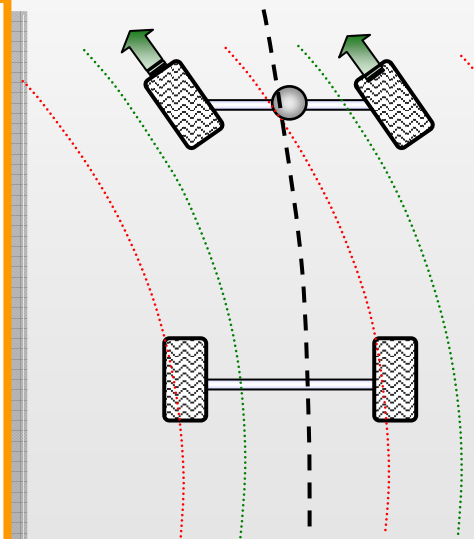
The Innovative Solution → the E-Q2 system

Electronic Q2

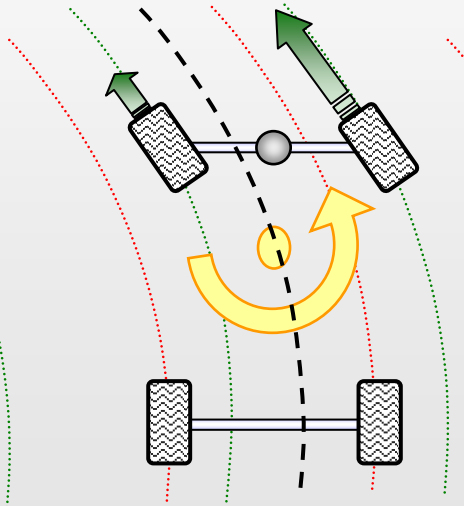
Electronically Controlled

Advantages:
- Road holding
- Traction
- Feeling
- Possibilità di tuning
- Tuning possible
- Lack of steering wheel reactions
- Limited cost > extension to the entire model line
- Applicable to Q4 as well (on rear wheels)

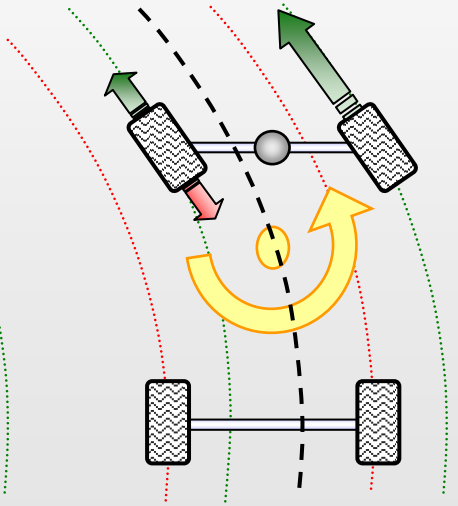
The Electronic Q2 is a device which is integrated with the stability control system VDC and allows for an increase in cornering stability by reacting in real time to loss of tire grip through specific intervention on one of the front wheels by the brake system.



Traditional front wheel drive



MECHANICAL Q2



E-Q2

The Innovative Solution → the E-Q2 system

Electronic Q2

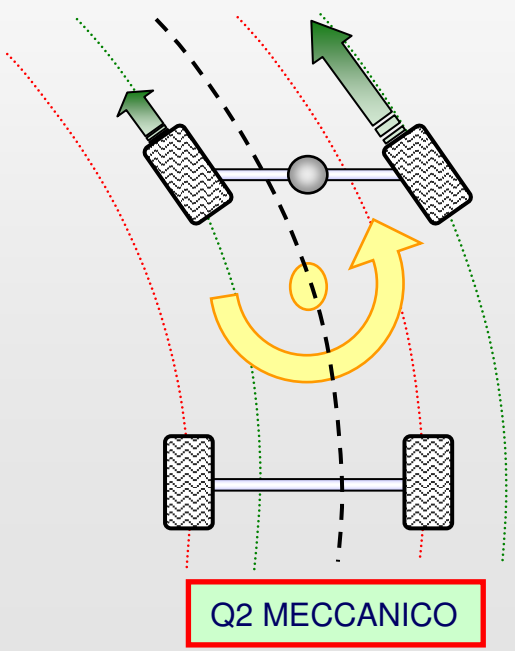
↓

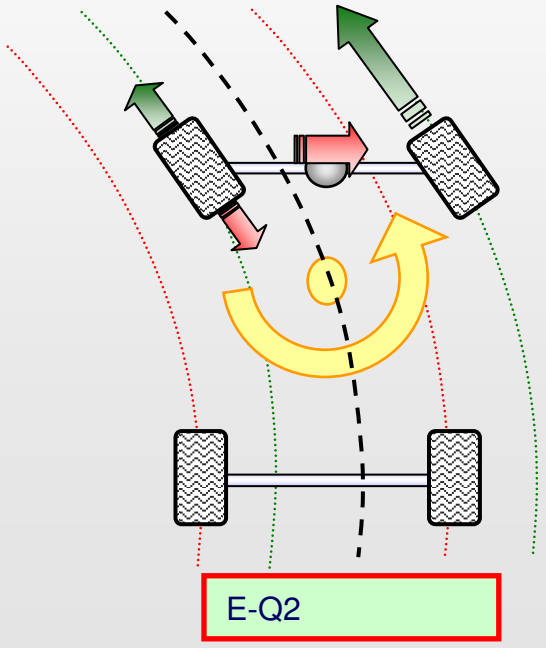
Electronically Controlled

↓

Advantages:
- Road holding
- Traction
- Feeling
- Possibilità di tuning
- Tuning possible
- Lack of steering wheel reactions
- Limited cost > extension to the entire model line
- Applicable to Q4 as well (on rear wheels)

Performance, handling and feeling are guaranteed, creating an effect similar to that of a mechanical auto-locking differential, by locally applying brake force on one of the front wheels. During in-corner acceleration, precisely calculated brake force is applied on the inner wheel in by the VDC control unit. This way, the differential transfers torque to the external wheel, increasing traction and reducing understeer.





The Innovative Solution → the E-Q2 system

Electronic Q2

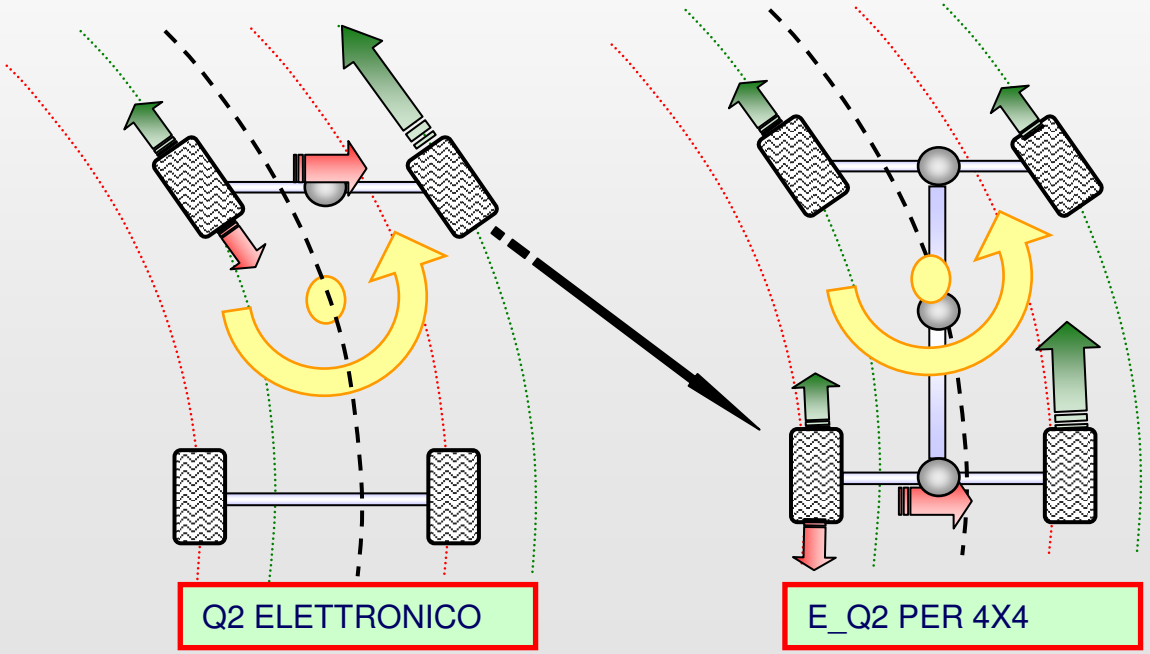
↓

Electronically Controlled

↓

Advantages:
- Road holding
- Traction
- Feeling
- Possibilità di tuning
- Tuning possible
- Lack of steering wheel reactions
- Limited cost > extension to the entire model line
- Applicable to Q4 as well (on rear wheels)

The E-Q2 system can also be applied to vehicles equipped with all wheel drive creating the performance of an electronically controlled rear auto-locking differential.



Starting from march production **E Q2** will be offered as a standard feature for

Alfa 159 MY ’08*

Brera and Spider MY ’08

*All the models equipped with VDC